UNITED STATES PATENT APPLICATION

LOCKING AEROSOL DISPENSER

Be it known that Patrick Timothy Yerby, a citizen of the United States of America and a resident of Woodstock in the State of Illinois, Peter J. Walters, a citizen of the United States of America and a resident of Barrington in the State of Illinois, and Craig A. Braun, a citizen of the United States of America and a resident of Elgin in the State of Illinois, have invented new and useful improvements in the above entitled invention the following of which is a specification in full, clear and exact terms to enable one skilled in the art to make and use the same.

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CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims benefit of United States utility application serial number 10/201,703 filed July 22, 2002 and United States provisional application serial number 60/397,938 filed July 22, 2002. All subject matter set forth in application serial number 10/201,703 and application serial number 60/397,938 are hereby incorporated by reference into the present application as if fully set forth herein.

BACKGROUND OF THE INVENTION

Field of The Invention

This invention relates to dispensers and more particularly to an improved locking aerosol dispensers for permitting and inhibiting the discharge of an aerosol product from an aerosol container.

Description of the Related Art

An aerosol dispensing device comprises an aerosol valve located internal an aerosol container. The aerosol valve is biased into a closed position. A valve stem cooperates with the aerosol valve for opening the aerosol valve. An actuator engages with the valve stem to open the aerosol valve for dispensing an aerosol product from the aerosol container. The aerosol product is dispensed from the aerosol valve through a spray nozzle.

Various types of actuators have been utilized by the prior art for actuating an aerosol dispensing device. The first and the most basic type of actuator for an aerosol dispensing device is an actuator button that is affixed to the valve stem. A depression of the actuator button depresses the valve stem to open the aerosol valve for dispensing the aerosol product from the aerosol container. A protective cap is utilized for engaging with a rim of the aerosol container for inhibiting accidental actuating of the aerosol button.

The second type of actuator for an aerosol dispensing device is an aerosol overcap. The aerosol overcap replaces the conventional protective cap and includes an actuator for actuating the aerosol valve of the aerosol dispensing device. The aerosol overcap comprises a base engagable with the rim of the aerosol container for mounting the overcap to the aerosol container. The aerosol

overcap includes an actuator pivotably mounted to the overcap base and engaging with the valve stem. The movement of the actuator of the aerosol overcap causes a depression of the valve stem to open the aerosol valve for dispensing the aerosol product from the aerosol container.

The third type of actuator for an aerosol dispensing device is an aerosol undercap. The aerosol undercap is used with an inverted aerosol container. The aerosol undercap is located at the base of the inverted aerosol container for supporting and storing the aerosol container in an inverted position. The aerosol undercap includes an actuator for actuating the aerosol valve of the aerosol dispensing device. The aerosol undercap comprises a base engagable with the rim of the aerosol container for mounting the undercap to the aerosol container. The aerosol undercap includes an actuator pivotably mounted to engage with the valve stem. The movement of the actuator of the aerosol undercap causes a depression of the valve stem to open the aerosol valve for dispensing the aerosol product from the aerosol container.

A fourth type of actuator for actuating an aerosol dispensing device is a trigger device. In this fourth type of actuator, a base is mounted either to the container rim or the mounting cup rim for supporting a trigger. The trigger is engagable with the valve stem. A movement of the trigger from an extended position to a protracted position depresses the valve stem to open the aerosol valve for dispensing the aerosol product from the aerosol container.

Aerosol dispenser devices traditionally dispense lower viscosity aerosol products such as hair spray, paint, deodorant, and the like in a spray form. The spray nozzle and aerosol valve is traditionally located on the top of the aerosol container for dispensing the aerosol products through the spray nozzle in an upright position.

Typically, high viscosity aerosol products like shaving gels as well as foaming aerosol products such as shave cream are stored in an upright position and are dispensed in an upright to

horizontal position. Other high viscosity foaming aerosol products such as hair mousse and rug cleaner are stored in an upright position but are dispensed in an inverted position.

The high viscosity foaming aerosol products that are dispensed in an inverted position are not designed to dispense in an upright position. If these foaming aerosol products are actuated in an upright oriented position, only the aerosol propellant would escape from the aerosol container and the aerosol product would remain in the aerosol container. This loss of the aerosol propellant may deplete the aerosol propellant prior to the complete dispensing of the aerosol product from the aerosol container.

Some in the prior art have incorporated a restricting device into an aerosol overcap for restricting the actuation of the aerosol dispensing device. Many of these prior art devices were used as child resistant safety devices and the like. The following United States patents are representative of some of the developments of the prior art to incorporate a restrictive device into an aerosol overcap for restricting the actuation of the aerosol dispensing device.

U.S. Patent D293,213 discloses a design patent for an aerosol overcap physically located on a top portion of the aerosol container for discharging an aerosol product in a conventional upright manner.

U.S. Patent 1,265,177 to Coleman discloses a receptacle including a cylindrical body having an outwardly flaring supporting flange fixed to its lower end. A bottom wall is secured in the cylindrical body above the point of connection of the flange. The flange is provided with an observation opening in one side thereof. A valve casing is connected to the bottom wall and depending therefrom. A rotary valve member is mounted in the casing to control the discharge of the contents of the receptacle. The valve has a stem rotatably supported in the flange.

U.S. Patent 2,765,959 to Elliott discloses a dispensing receptacle for cans of pressurized

material of the type having a tiltable valve controlling spout. The can containing receptacle has an open bottom and an open top and a closure for the top. Means hold a can in the container with the dispensing spout extending through the open bottom. The means includes shoulders in the receptacle and a spring between the closure and the bottom of the can biasing the can against the shoulders. The can is telescoped within the receptacle. Laterally movable means extends through the side wall of the receptacle for engaging and tilting the tiltable valve controlling spout. The last mentioned means comprises a stem removably abutting the spout. Spring means biases the stem outwardly of the receptacle. A push bottom on the outer end of the stem moves the stem inwardly to tilt the spout.

U.S. Patent 3,272,392 discloses a dispensing package for materials under pressure comprising a container having a material under pressure therein. Valve means is mounted on the container for dispensing said material on the operation thereof. The valve means includes a projecting stem portion movable relative to said container for operating said valve means and having a passage therein for passing said material. Actuating means is operable to move said stem portion relative to said container for operating said valve means. The actuating means comprises a part connected to said stem portion. The part has means therein cooperating with the passage in said stem portion for communicating the latter outwardly of said dispensing package. The part is movable relative to said container on the application thereagainst of pressure applied from a position predeterminately located relative to said container in a direction substantially transverse to the axis of said stem portion for operating said valve means.

U.S. Patent 3,759,431 to Vos discloses a pressurized package of the class that includes a container for receiving a product. Propellant means in the container discharges the product from the container. A dispensing assembly is mounted on the container characterized by an actuating

lever. The actuating lever shifts to displace a flexible resilient valve body member from a position in which its discharge orifice-containing surface is in scaled engagement at least partially effected by the internal container pressure with a valve cap to a position in which it is aligned with an exit opening of the overcap.

U.S. Patent 3,979,163 discloses a cleaning and scrubbing tool having a cleaning head and aerosol can handle in which a suitably operational scrub pad is supported by head bracket extension in free cleaning liquid passing relation, interlocked with portions of the pad by localized deflection of the extension, suitably by locally heating or solvating the extension to deflectable condition within the pad interior.

U.S. Patent 4,254,899 to Klaas J. van Lit discloses a self-aligning overcap and button for aerosol containers including a button having a side surface terminating upwardly in a cylindrical wall surrounding a recessed upper surface which includes two helical ramps extending in opposite directions from a well adjacent to the wall to meet in a substantially radial edge diametrically opposite the well, and an overcap for engagement with the button, the overcap having a pointed alignment pin extending from the underside of an actuator tab and in position for engagement with the ramps and dimensioned for free insertion into the well in the button. Rotational alignment of the overcap and the button are accomplished under the force of gravity. In preferred embodiments the cylindrical wall of the button has an upper edge defining a plane substantially perpendicular to the axis of the button. In other preferred embodiments the actuator tab includes a cylindrical guide-sleeve dimensioned to receive the button.

U.S. Patent 4,328,911 to Michael G. Knickerbocker discloses a child resistant assembly comprising an actuator button having a terminal orifice connected through a valve stem to a valve for enabling discharge of the aerosol product from the terminal orifice upon opening the valve. An

overcap is rotatably secured to the aerosol container and includes a finger actuator movably mounted relative to the overcap. A non-symmetrical surface is disposed on either the actuator button or the finger actuator for cooperation with an engaging surface on the other of the actuator button and the finger actuator. The engaging surface engages the non-symmetrical surface for transferring the finger movement of the operator to open the valve only upon a selected orientation of the finger actuator relative to the actuator button. The engaging surface fails to contact the non-symmetrical surface upon finger movement of the operator when the finger actuator is in a non-selected orientation relative to the actuator button.

U.S. Patent 4,354,621 to Michael G. Knickerbocker discloses a child resistant assembly for use with an aerosol container having a valve. The assembly comprises an actuator button having a terminal orifice connected through a valve stem to the valve for enabling discharge of the aerosol product from the terminal orifice upon opening the valve. An overcap is rotatably secured to the aerosol container and includes a finger actuator movably mounted relative to the overcap. A non-symmetrical aperture is disposed in either the actuator button or the finger actuator for cooperation with a non-symmetrical member in the other of the actuator button and the finger actuator. The non-symmetrical member enters the non-symmetrical aperture for transferring the finger movement of the operator to open the valve only upon a selected orientation of the finger actuator relative to the actuator button.

U.S. Patent 4,416,398 to Michael G. Knickerbocker discloses a plural spray rate aerosol assembly for use with an aerosol container having a plural spray rate valve. The assembly comprises an actuator button having a terminal orifice connected through a valve stem to the plural spray rate valve for enabling a first discharge rate of the aerosol product from the terminal orifice upon opening the valve in a first position and for enabling a second discharge rate of the aerosol

product from the terminal orifice upon opening the valve in a second position. An overcap is rotatably secured to the aerosol container and includes a finger actuator movably mounted relative to the overcap. A non-symmetrical aperture is disposed in either the actuator button or the finger actuator for cooperation with a non-symmetrical element in the other of the actuator button and the finger actuator. The non-symmetrical element is inhibited from entering the non-symmetrical aperture for transferring the finger movement of the operator to open the valve in the first position upon a first selected orientation of the finger actuator relative to the actuator button. The non-symmetrical element enters the non-symmetrical aperture for transferring the finger movement of the operator to open the valve in the second position upon a second selected orientation of the finger actuator relative to the actuator button.

U.S. Patent 4,426,026 to Michael G. Knickerbocker discloses an aerosol assembly for use with an aerosol container having a valve for discharging product and propellant through a terminal orifice. The invention comprises an actuator button in fluid communication with the terminal orifice. The actuator button is connected to the aerosol valve through a valve stem for opening the aerosol valve upon movement of the actuator button. The actuator button is substantially the shape of a truncated cone having a larger cross-section at the base with respect to the cross-section at the top of the button. A one-piece overcap having an integral finger actuator is secured to the aerosol container for covering the actuator button. Engaging surfaces preferably having plural projections are disposed on the underside of the finger actuator for contacting the actuator button upon movement due to the finger pressure of the operator to open the valve and initiate fluid flow from the terminal orifice.

U.S. Patent 5,385,272 to Aoun discloses a hand held, free standing, bottom dispensing dispenser, generally made of plastic, for the dispensing of thick liquids such as lotions, sham-

poos. and processed foodstuff, having a resiliently walled reservoir that sits atop a stand that offers fulcrum for a mechanical linkage. The linkage has a top portion engaged to the reservoir side wall allowing the user's hand to grasp and manipulate the linkage while grasping and manipulating the reservoir. A bottom portion is coupled to dispensing valve disposed and adapted to open and close a discharge element affixed to an outlet in the bottom end of the reservoir. Thus, when hand pressure is applied to the linkage top portion at the same time the reservoir is squeezed and the motion transmitted by the linkage to the dispensing valve opens the latter to dispense a portion of the content. When pressure is relieved, the resilient reservoir side wall rebounds back to its initial shape and, the reservoir side wall being engaged to the linkage moves the latter back to its initial position. Thus while causing the dispensing valve to gradually close, the reservoir side wall outward movement induces in the reservoir an air flow that draws the fluid in the discharge element in therewith. The dispenser content is always located in the lower part of the reservoir near its aperture, ready to be dispensed therefore making possible the dispensing of virtually all the content.

U.S. Patent 5,957,336 to Radassao et al. discloses a viscous fluid dispenser including an upper extent constructed from a flexible material and having a top face and a peripheral side wall with an inverted frustoconical configuration defining a lower peripheral edge. Further provided is a lower extent constructed from a rigid material and having a planar bottom face coupled with respect to the lower peripheral edge of the upper extent. The bottom face of the lower extent has at least one bore formed therein. Next provided is a lid hingably coupled to the lower extent for selectively closing the bore.

U.S. Patent 6,010,042 to Boucher et al. discloses a base end dispensing container, especially suitable for dispensing viscous flowable liquid consumable products. The container in-

cludes an elongated, squeezable, container having an inner chamber for holding the viscous flowable liquid consumable products. A base dispensing valve, a top end valve operating mechanism and an attached support structure support the container in an upright position a distance front a surface upon which the container is placed. The base end dispensing valve includes a sloping container floor terminating at a substantially flat section, upon which a rotationally operable valve gate rests. The substantially flat floor section of the container includes at least one dispensing opening intermediate the interior chamber of the container and the outside of the container. The valve gate is selectively operated between an open and shut position by the top end valve operating mechanism via a valve driven shaft which connects the valve operating mechanism with the rotationally operable valve gate.

U.S. Patent 6,491,187 to Walters disclosed a novel inverted aerosol dispensing device comprising an undercap secured to a bottom portion of an aerosol container for supporting the aerosol container on a supporting surface. The novel inverted aerosol dispensing device included an actuator movably mounted relative to the undercap for moving the valve stem upon displacement of the actuator for discharging the aerosol product from the valve stem in a generally downwardly direction through the undercap.

Therefore it is an object of the present invention to provide a locking dispenser actuator for locking an actuator of an aerosol valve for inhibiting actuation thereof.

Another object of the present invention is to provide a locking dispenser actuator which incorporates an actuator rotatably mounted to an aerosol container for enabling discharge of the aerosol product in a first rotational position and for inhibiting discharge of the aerosol product in a second rotational position.

Another object of the present invention is to provide a locking dispenser actuator

incorporated into an undercap mounted to a bottom portion of the aerosol container.

Another object of the present invention is to provide a locking dispenser actuator incorporated into an overcap mounted to a top portion of the aerosol container.

Another object of the present invention is to provide an locking dispenser actuator incorporated into an undercap rotatably mounted to a bottom portion of the aerosol container for enabling discharge of the aerosol product in a first rotational position and for inhibiting discharge of the aerosol product in a second rotational position.

Another object of the present invention is to provide a locking dispenser actuator incorporated into an overcap rotatably mounted to a top portion of the aerosol container for enabling discharge of the aerosol product in a first rotational position and for inhibiting discharge of the aerosol product in a second rotational position.

Another object of the present invention is to provide locking dispenser actuator which is suitable for use with plastic containers.

Another object of the present invention is to provide locking dispenser actuator which is economical to manufacture and is economical to install on the aerosol dispensing device.

The foregoing has outlined some of the more pertinent objects of the present invention. These objects should be construed as being merely illustrative of some of the more prominent features and applications of the invention. Many other beneficial results can be obtained by applying using the disclosed invention in a different manner or modifying the invention. Accordingly other objects in a full understanding of the invention may be had by referring to the summary of the invention and the detailed description describing the preferred embodiment of the invention.

SUMMARY OF THE INVENTION

A specific embodiment of the present invention is shown in the attached drawings. For the purpose of summarizing the invention, the invention relates to a locking aerosol dispenser for an aerosol dispensing device having an aerosol valve for controlling the flow of an aerosol product from an aerosol container. The locking aerosol dispenser comprises an actuator secured to the aerosol valve for displacing the aerosol valve from a biased closed position to an open position to discharge the aerosol product. The actuator is rotatable into a first rotational position relative to the aerosol container for enabling the actuator to open the aerosol valve upon movement of the actuator for discharging the aerosol product. The actuator is rotatable into a second rotational position relative to the aerosol container for inhibiting the actuator from opening the aerosol valve.

In another example of the invention, the lock for an aerosol dispensing device comprises an aerosol cap being rotatably securing the aerosol cap to the aerosol container. The aerosol container and the aerosol cap define cooperating key and key aperture. The actuator is rotatable into a first rotational position relative to the aerosol container whereat the key is aligned with the key aperture for enabling movement of the actuator to open the aerosol valve for discharging the aerosol product. The actuator is rotatable into a second rotational position relative to the aerosol container whereat the key is misaligned with the key aperture for inhibiting the actuator from opening the aerosol valve.

In still another example of the invention, the lock for an aerosol dispensing device comprises an aerosol cap having a resilient cap mounting. A valve button has a button socket for frictionally receiving said valve stem with the button socket communicating with a terminal ori-

fice. A frangible bridge interconnects the valve button to the aerosol cap. The aerosol cap and the valve button are initially simultaneously mounted relative to the aerosol container with the aerosol cap being resiliently mounted to the aerosol container concomitantly with the button socket of the valve button frictionally receiving the valve stem. The frangible bridge is severed upon the aerosol cap being completely resiliently mounted to the aerosol container concomitantly with the button socket of the valve button frictionally completely receiving the valve stem for separating the valve button from the aerosol cap.

In a further another example of the invention, the lock for an aerosol dispensing device the aerosol container defining a container axis extending between a top portion and a bottom portion of the aerosol container. The aerosol valve has a valve button defining a terminal orifice secured to the valve stem of the aerosol valve. The valve button displaces the aerosol valve from a biased closed position to an open position to discharge the aerosol product from the terminal orifice of the valve button. One of the valve button and the aerosol cap is non-symmetric about the container axis for enabling the actuator to move the valve button when the aerosol cap is rotated into the first rotational position for displacing the aerosol valve into an open position to discharge the aerosol product from the valve stem.

The lock for an aerosol dispensing device of the present invention may be incorporated into an aerosol button actuator or may be incorporated into an aerosol overcap secured to the top of the aerosol container or may be incorporated into an aerosol undercap secured to the bottom of an inverted aerosol container

The foregoing has outlined rather broadly the more pertinent and important features of the present invention in order that the detailed description that follows may be better understood so that the present contribution to the art can be more fully appreciated. Additional features of the

invention will be described hereinafter which form the subject matter of the invention. It should be appreciated by those skilled in the art that the conception and the specific embodiments disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. It should also be realized by those skilled in the art that such equivalent constructions do not depart from the spirit and scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature and objects of the invention, reference should be made to the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a front view of a first embodiment of a locking aerosol dispenser with an undercap being rotated into a first rotational position relative to the aerosol container;

FIG. 2 is a similar view of the undercap to FIG. 1 with the undercap being rotated into second rotational position relative to the aerosol container;

FIG. 3 is a sectional view along line 3-3 in FIG. 1;

FIG. 4 is a sectional view along line 4-4 in FIG. 2;

FIG. 5 is an enlarged view of a portion of FIG. 3;

FIG. 6 is an enlarged view of a portion of FIG. 4;

FIG. 7 is a magnified view of a portion of FIG. 5;

FIG. 8 is a view along line 8-8 in FIG. 7;

FIG. 9 is a side sectional view of the undercap removed from the aerosol container;

FIG. 10 is a view along line 10-10 in FIG. 9;

FIG. 11 is a further magnified view of a portion of FIG. 7;

FIG. 12 is a sectional view along line 12-12 in FIG. 11;

FIG. 13 is a view similar to FIG. 11 illustrating a different rotational position of the undercap;

FIG. 14 is a sectional view along line 14-14 in FIG. 13;

FIG. 15 is a bottom view of the aerosol container;

FIG. 16 is a left side view of FIG. 15;

FIG. 17 is a right side view of FIG. 15;

FIG. 18 is a front elevational view of the locking aerosol dispenser with the undercap disposed in the first or open rotational position;

FIG. 19 is a side view of FIG. 18;

FIG. 20 is a sectional view along line 20-20 in FIG. 19;

FIG. 21 is a sectional view of the undercap shown in FIG. 19;

FIG. 22 is a sectional view along line 22-22 in FIG. 18 with the actuator being located in an unattended condition;

FIG. 23 is a bottom view of FIG. 22;

FIG. 24 is a view similar to FIG. 22 with the actuator being located in a depressed condition;

FIG. 25 is a bottom view of FIG. 24;

FIG. 26 is a front elevational view of the locking aerosol dispenser with the undercap disposed in the second or locked rotational position;

FIG. 27 is a side view of FIG. 26;

FIG. 28 is a sectional view along line 28-28 in FIG. 27;

FIG. 29 is a sectional view of the undercap shown in FIG. 27;

FIG. 30 is a sectional view along line 30-30 in FIG. 26 with the actuator being located in an unattended condition;

FIG. 31 is a bottom view of FIG. 30;

FIG. 32 is a view similar to FIG. 30 with the actuator being located in a depressed condition;

FIG. 33 is a bottom view of FIG. 32;

FIG. 34 is a side view of a second embodiment of the locking aerosol dispenser with an overcap being rotated into a first or open rotational position relative to the aerosol container;

FIG. 35 is a top view of FIG. 34;

FIG. 36 is a front view of FIG. 34;

FIG. 37 is a top view of FIG. 36;

FIG. 38 is an enlarged sectional view along line 38-38 in FIG. 35;

FIG. 39 is a magnified sectional view along line 39-39 in FIG. 38;

FIG. 40 is an enlarged sectional view along line 40-40 in FIG. 37;

FIG. 41 is a magnified view of a portion of FIG. 40;

FIG. 42 is a top view of the aerosol container;

FIG. 43 is a left side view of FIG. 42;

FIG. 44 is a right side view of FIG. 42;

FIG. 45 is a sectional view along line 45-45 in FIG. 36 with the actuator being shown in an unattended condition;

FIG. 46 is an enlarged view of a portion of FIG. 45;

FIG. 47 is view similar to FIG. 45 with the actuator being shown in a depressed condition;

FIG. 48 is an enlarged view of a portion of FIG. 47;

FIG. 49 is a rear view similar to FIG. 34 with the overcap being rotated into a second or locked rotational position relative to the aerosol container;

FIG. 50 is a top view of FIG. 49;

FIG. 51 is a side view of FIG. 49;

FIG. 52 is a top view of FIG. 51;

FIG. 53 is a sectional view along line 53-53 in FIG. 51 with the actuator being shown in an unattended condition;

FIG. 54 is an enlarged view of a portion of FIG. 53;

FIG. 55 is a rear view of a third embodiment the locking aerosol dispenser with an actuator being rotated into a first rotational or open position relative to the aerosol container;

FIG. 56 is a top view of FIG. 55;

FIG. 57 is a side view of the locking aerosol dispenser shown in FIG. 55;

FIG. 58 is a top view of FIG. 57;

FIG. 59 is an enlarged view of a portion of FIG. 55 with the actuator being shown in an unattended condition;

FIG. 60 is a sectional view along line 60-60 in FIG. 59;

FIG. 61 is a view similar to FIG. 59 with the actuator being shown in a depressed condition;

FIG. 62 is a sectional view along line 62-62 in FIG. 61;

FIG. 63 is a front view of the locking aerosol dispenser shown in FIG. 55 with the actuator being rotated into a second or locked rotational position relative to the aerosol container;

FIG. 64 is a top view of FIG. 63;

FIG. 65 is a side view of FIG. 63;

FIG. 66 is a top view of FIG. 65;

FIG. 67 is an enlarged view of a portion of FIG. 63 with the actuator being shown in an unattended condition; and

FIG. 68 is a sectional view along line 68-68 in FIG. 67.

Similar reference characters refer to similar parts throughout the several Figures of the drawings.

DETAILED DISCUSSION

FIGS. 1 and 2 are isometric views of a first embodiment of a locking aerosol dispenser 10A. The locking aerosol dispenser 10A dispenses an aerosol product 14 by an aerosol propellant 16 from an aerosol container 20A. In this first embodiment of the present invention, the locking aerosol dispenser 10A enables the aerosol container 20A to be stored in an inverted position. The locking aerosol dispenser 10A dispenses the aerosol product 14 under the pressure of the aerosol propellant 16 in a generally downward direction through an undercap 30A. The invention is particularly useful in dispensing viscous aerosol products 14.

FIGS. 3 and 4 are sectional views of FIGS. 1 and 2 illustrating the undercap 30A for supporting the aerosol container 20A in the inverted position. The undercap 30A is rotationally secured to the aerosol container 20A by the mounting 40A. The undercap 30A includes an actuator 50A pivotably connected to the undercap 30A by a hinge 60A. The actuator 50A is shown in an unattended condition.

A valve button 70A is connected to an aerosol valve 80A mounted to the aerosol container 20A by an aerosol mounting cup 90A. Preferably, the aerosol valve 80A is a tilt valve but it should be understood that the invention may be modified to function with a vertical action valve.

FIGS. 1 and 3 illustrate the undercap 30A in a first or open rotational position relative to the aerosol container 20A. When the undercap 30A is located in the first or open rotational position, the actuator 50A is positioned for engaging the valve button 70A to actuate the aerosol valve 80A. The actuation of the aerosol valve 80A enables the aerosol product 14 to be dispensed under the pressure of the aerosol propellant 16 from the aerosol container 20A and to be discharged from the valve button 70A.

FIGS. 2 and 4 illustrate the undercap 30A in a second or locked rotational position relative to the aerosol container 20A. When the undercap 30A is located in the second or locked rotational position, the actuator 50A is inhibited from engaging the valve button 70A to prevent the aerosol product 14 from being dispensed from the aerosol container 20A.

The container 20A is shown as a cylindrical container disposed in an inverted orientation. The aerosol container 20A extends between a top portion 21A and a bottom portion 22A. The top portion 21A of the aerosol container 20A is closed by an endwall. The aerosol container 20A defines a cylindrical sidewall 23A defining a container rim 24A extending about an outer diameter of the aerosol container 20A.

The aerosol product 14 is contained near the bottom portion 22A of the aerosol container 20A whereas the aerosol propellant 16 is contained near the top portion 21A of the aerosol container 20A. The locking aerosol dispenser 10A is especially suited for dispensing viscous products like shampoo, hair conditioner, hair gel, hair mousse or non-foaming soap. In addition, the locking aerosol dispenser 10A is especially suited for dispensing viscous food products such as ketchup, mustard, mayonnaise and the like. The locking aerosol dispenser 10A is adapted for dispensing products such as furniture polish in a downward direction through the use of an appropriate valve button 70A. The aerosol propellant 16 may be compressed gas, carbon dioxide or any other suitable propellant.

FIGS. 5 and 6 are enlarged views of portions of FIGS. 3 and 4 respectively. The bottom portion 22A of the aerosol container 20A tapers radially inwardly into a neck 25A terminating in a bead 26A. The aerosol container 20A defines an axis of symmetry 29A. The aerosol container 20A may be made of a metallic material or a non-metallic material. In this example, the aerosol container 20A is shown as a plastic bottle.

The aerosol valve 80A is secured to the aerosol mounting cup 90A in a conventional fashion. A peripheral rim 92A of the aerosol mounting cup 90A is sealed to the bead 26A of the aerosol container 20A. A valve stem 82A extends from the aerosol valve 80A in alignment with an axis of symmetry 29A of the aerosol container 20A. A valve stem 82A is adapted to be received by a socket 73A of the valve button 70A.

FIGS. 7-10 are various views of the undercap 30A and the valve button 70A. The undercap 30A has a top portion 31A and a bottom portion 32A with a sidewall 33A extending therebetween. The undercap 30A includes a base 34A for supporting the aerosol container 20A on a supporting surface in an inverted position.

The top portion 31A of the undercap 30A has a generally circular cross-section for mating with the bottom portion 22A of the aerosol container 20A. When the undercap 30A is secured to the aerosol container 20A the generally circular cross-section of the top portion 31A is aligned with the axis of symmetry 29A of the aerosol container 20A.

The bottom portion 32A of the undercap 30A includes a gripping area 36A having an elliptically-shaped cross-section. The elliptically-shaped cross-section is offset from the axis of symmetry 29A of the aerosol container 20A.

The elliptical bottom portion 32A of the undercap 30A defines a first sidewall portion 37A and a second sidewall portion 39A. The first sidewall portion 37A is located closer to the axis of symmetry 29A of the aerosol container 20A than the second sidewall portion 39A of the undercap 30A.

The undercap 30A comprises a plastic shell defining an undercap aperture 38A. The undercap aperture 38A provides a passage for dispensing the aerosol product 14 in a generally downward direction through the undercap 30A. A sidewall orifice 39A is defined in the sidewall

33A of the undercap 30A. Preferably, the undercap 30A is formed from a unitary and resilient polymeric material such as polypropylene, polyethylene, polyolyfin or any other suitable polymeric material.

FIGS. 8-10 further illustrate the undercap 30A of the locking aerosol dispenser 10A. The rotational mounting 40A comprises a plurality of minor ribs 41A and a plurality of major ribs 42A extending inwardly from the sidewall 33A of the undercap 30A.

The plurality of minor ribs 41A extend inwardly from the first sidewall portion 37A of the sidewall 33A of the undercap 30A adjacent to the actuator 50A. Each of the plurality of minor ribs 41A terminates in a tapered end 43A adjacent to the top portion 31A of the undercap 30A. Each of the plurality of minor ribs 41A has an inwardly extending minor tab 45A.

The plurality of major ribs 42A extend inwardly from the second sidewall portion 39A of the sidewall 33A of the undercap 30A opposite from the actuator 50A. Each of the plurality of major ribs 42A terminates in a tapered end 44A adjacent to the top portion 31A of the undercap 30A. Each of the plurality of major ribs 42A has an inwardly extending major tab 46A. Preferably, the undercap 30A and the plurality of minor and major tabs 45A and 46A are integrally formed from a deformable and resilient polymeric material. The deformable and resilient material enables the undercap 30A to be resiliently mounted to the aerosol container 20A.

As best shown in FIGS. 5-8, the plurality of minor and major tabs 45A and 46A engage with the peripheral rim 92A of the aerosol mounting cup 90A. Simultaneously therewith, the top portion 31A of the undercap 30A engages with the aerosol container 20A. The simultaneous engagement of the plurality of minor and major tabs 45A and 46A and the top portion 31A of the undercap 30A with the aerosol container 20A forms the rotational mounting 40A to secure the undercap 30A to the aerosol container 20A. Preferably, the undercap 30A is snapped over the

peripheral rim 92A of the aerosol mounting cup 90A to form a rotational snap locking engagement.

The actuator 50A is movably mounted relative to the undercap 30A. In this example of the invention, the actuator 50A is pivotably mounted relative to undercap 30A for moving the valve button 70A and the valve stem 82A upon pivoting of the actuator 50A. The actuator 50A is shown integrally connected to the undercap 30A through the hinge 60A integrally molded as a one-piece plastic unit with the undercap 30A. In this example, the hinge 60A pivots the actuator 50A about a hinge pivot axis generally perpendicular to the axis of symmetry 29A of the aerosol container 20A. However, it should be understood that the hinge 60A may pivot the actuator 50A about a hinge pivot axis having various angular or parallel relationships with the axis of symmetry 29A of the aerosol container 20A.

The actuator 50A includes an actuator surface 52A extending radially inwardly from the actuator 50A. The actuator surface 52A engages the valve button 70A upon an inward movement of the actuator 50A. The displacement of the actuator 50A moves the actuator surface 52A into engagement with the valve button 70A to displace the aerosol valve 80A into the open position to dispense the aerosol product 14 under the pressure of the aerosol propellant 16.

The valve button 70A extends between a top portion 71A and a bottom portion 72A. The top portion 71A of the valve button 70A is provided with a socket 73A for frictionally receiving the valve stem 82A of the aerosol valve 80A. A channel 76A extends through the valve button 70A to provide fluid communication between the valve stem 82A of the aerosol valve 80A and a terminal orifice 78A of the valve button 70A. In this embodiment of the invention, the valve button 70A comprises a generally tubular member 74A extending between the top portion 71A and the bottom portion 72A. The channel 76A extends through the tubular member 74A in alignment with the axis of symmetry 29A of the aerosol container 20A.

An enlarged flange 75A extends radially outwardly from the generally tubular member 74A. The enlarged flange 75A extends generally perpendicular to the tubular member 74A of the valve button 70A. The enlarged flange 75A extends non-symmetrically about the tubular member 74A. In this example, the enlarged flange 75A is shown as a generally elliptical flange 75A. The generally elliptical flange 75A is offset from the tubular member 74A and the channel 76A extending through the valve button 70A.

The enlarged flange 75A defines a first projecting surface 77A and a second projecting surface 79A. The first projecting surface 77A extends further from the tubular member 74A of the valve button 70A than the second projecting surface 79A.

FIGS. 11-17 are various views illustrating a locator 100A of the locking aerosol dispenser 10A. The locator 100A locates the undercap 30A in the first and second first rotational positions relative to the aerosol container 20A. The locator 100A comprises a container locator 110A defined by the aerosol container 20A. The locator 100A comprises an undercap locator 120A defined by the undercap 30A. The container locator 110A cooperates with the undercap locator 120A for locating the undercap 30A in the first rotational position relative to the aerosol container 20A.

The container locator 110A extends radially outwardly from the neck 25A of the aerosol container 20A. In this example, the container locator 110A comprises an open container locator 111A and a locked container locator 112A. The open container locator 111A and the locked container locator 112A extend radially outwardly from the neck 25A of the aerosol container 20A. Preferably, the container locators 111A and 112A are integrally molded with the aerosol container 20A.

The open and locked container locators 111A and 112A extend longitudinally along the

neck 25A of the aerosol container 20A. The open and locked container locators 111A and 112A extend only partially along the neck 25A to define a void 28A between the termination of each of the open and locked container locators 111A and 112A and the container bead 26A of the aerosol container 20A. The voids 28A provide a space for enabling the major and minor tabs 41 and 42 to pass therethrough. Preferably, the open and locked container locators 111A and 112A are integrally molded with the aerosol container 20A.

The undercap locator 120A extends radially inwardly from the undercap. The undercap locator 120A extends a longitudinal distance along the undercap 30A greater than the longitudinal distance of the major and minor tabs 45A and 46A. The greater longitudinal distance of the undercap locator 120A provides an interference cooperation between each of the open and locked container locators 111A and 112A and the undercap locator 120A.

The locking aerosol dispenser 10A may optionally include an indicator 130A for indicating the position of the undercap 30A relative to the aerosol container 20A. The indicator 130A comprises container indicators 131A and 132A cooperating with an undercap indicator 133A for indicating the first and second first rotational positions of the undercap 30A relative to the aerosol container 20AE.

FIGS. 11and 12 illustrate the open container locator 111A engaging with the undercap locator 120A for locating the undercap 30A in the first rotational position of the relative to the aerosol container 20A. The open container locator 111A comprises a minor and a major projection 113A and 114A. The minor projection 113A extends radially outwardly a minor distance from the neck 25A of the aerosol container 20A. The major projection 114A extends radially outwardly a major distance from the neck 25A of the aerosol container 20A. The minor distance of the minor projection 113A is substantially less than the major distance of the major projection 114A.

The minor distance of the minor projection 113A enables the undercap locator 120 to pass over the minor projection 113A during rotation of the undercap locator 30A relative to the aerosol container 20A. Preferably, the minor distance of the minor projection 113A is selected to produce a tactile and/or audible click as the undercap locator 120A passes over the minor projection 113A. Preferably, the minor distance of the minor projection 113A produces both a tactile and an audible sound to indicate the undercap 30A has been rotated into the first rotational position relative to the aerosol container 20A.

The major distance of the major projection 114A provides a rotational stop upon the undercap locator 120A engaging with the major projection 114A. The engagement of the undercap locator 120A with the major projection 114A locates the undercap 30A in the first rotational position relative to the aerosol container 20A.

The minor and major projections 113A and 114A provides a slot therebetween. The slot between the minor and major projections 113A and 114A retains the undercap locator 120A therein. The slot between the minor and major projections 113A and 114A maintains the undercap 30A in the first rotational position relative to the aerosol container 20A.

FIGS. 13 and 14 illustrate a different rotational position of the undercap 30A relative to the aerosol container 20A. The void 28A between the termination of the open container locator 111A and the container bead 26A of the aerosol container 20A provides a space for enabling the major and minor tabs 41A and 42A to pass through the void 28A.

FIGS. 15-17 illustrate various views of the aerosol container 20A without the undercap 30A. The locked container locator 112A is substantially similar to the open container locator 111A. The locked container locator 112A comprises a minor and a major projection 115A and 116A extending radially outwardly a minor and major distance from the neck 25A of the aerosol contain-

er 20A. The minor projection 115A produces a tactile and/or audible click as the undercap locator 120A passes over the minor projection 115A.

The major projection 116A provides a rotational stop upon the undercap locator 120A engaging with the major projection 114A to locate the undercap 30A in the second rotational position relative to the aerosol container 20A. The slot between the minor and major projections 115A and 116A maintains the undercap 30A in the second rotational position relative to the aerosol container 20A.

FIGS. 15-17 further illustrate the spatial relationship between the open container locator 111A and the container indicators 131A and the spatial relationship between the open container locator 112A and the container indicators 132A. Preferably, the container locator 110A and the container indicators 130A are integrally molded with the aerosol container 20A.

FIGS. 18-23 illustrate the locking aerosol dispenser 10A with the undercap 30A disposed in the first rotational position and with the actuator 50A being located in an unattended condition. In the first rotational position, the container indicator 131A is aligned with the undercap indicator 133A.

When the undercap 30A is disposed in the first rotational position, the first sidewall portion 37A of the sidewall 33A of the undercap 30A is located adjacent to the first projecting surface 77A of the valve button 70A. The first projecting surface 77A of the valve button 70A is in close proximity to the first sidewall portion 37A of the sidewall 33A of the undercap 30A. The second projecting surface 79A of the valve button 70A is spaced apart from the major ribs 42A of the second sidewall portion 37A of the sidewall 33A of the undercap 30A.

FIGS. 24 and 25 are views similar to FIGS. 22 and 23 illustrating the actuator 50A in a depressed condition. When the actuator 50A is in the depressed condition, the first sidewall portion

37A of the sidewall 33A engages with the first projecting surface 77A of the valve button 70A to move the valve button 70A and the valve stem 82A. The movement of the valve button 70A and the valve stem 82A moves the aerosol valve 80A into the open position to dispense the aerosol product 14. The spacing between the second projecting surface 79A and the second sidewall portion 39A of the undercap 30A allows the valve button 70A to move for opening the aerosol valve 80A.

FIGS. 26-31 illustrate the locking aerosol dispenser 10A with the undercap 30A disposed in the second rotational position and with the actuator 50A being located in an unattended condition. In the second rotational position, the container indicator 132A is aligned with the undercap indicator 133A.

When the undercap 30A is disposed in the second rotational position, the first sidewall portion 37A of the sidewall 33A of the undercap 30A is located adjacent to the second projecting surface 79A of the valve button 70A. The second projecting surface 79A of the valve button 70A is spaced apart from the first sidewall portion 37A of the sidewall 33A of the undercap 30A. The first projecting surface 79A of the valve button 70A is in close proximity to the major ribs 42A of the second sidewall portion 39A of the sidewall 33A of the undercap 30A.

FIGS. 32 and 33 are views similar to FIGS. 30 and 31 illustrating the actuator 50A in a depressed condition. When the actuator 50A is in the depressed condition, the first sidewall portion 37A of the sidewall 33A fails to engage with the second projecting surface 79A of the valve button 70A. The spacing between the second projecting surface 79A and the first sidewall portion 37A of the undercap 30A inhibits the depressed actuator 50A from moving the valve button 70A to open the aerosol valve 80A. In addition, the first projecting surface 79A of the valve button 70A is in close proximity to the major ribs 42A of the second sidewall portion 39A of the sidewall 33A of the

undercap 30A to prevent movement of the valve button 70A.

The undercap 30A and the valve buttom 70A may be molded as a single part with the valve button 70A being connected to the undercap 30A by a frangible bridge (not shown). In one example, the first projecting surface 79A of the valve button 70A is connected by a frangible bridge (not shown) to the major ribs 42A of the second sidewall portion 39A of the sidewall 33A of the undercap 30A.

After the filling of the aerosol container 20A with the aerosol product 14 and the aerosol propellant 16, the undercap 30A and the valve button 70A connected by the frangible bridge (not shown) is simultaneously moved toward the aerosol container 20A. The movement caused the undercap 30A to be snapped over the peripheral rim 92A of the aerosol mounting cup 90A simultaneously with the socket 73A of the valve button 70A frictionally receiving the valve stem 82A.

After the installation of the undercap 30A upon the aerosol container 20A and upon complete installation of the valve button 70A upon the valve stem 82A of the aerosol valve 80A, a continued movement fractures the frangible bridge (not shown) to separate the valve button 70A from the undercap 40A.

FIGS. 34-37 are various views of a second embodiment of the locking aerosol dispenser 10B of the present invention. The locking aerosol dispenser 10B dispenses an aerosol product 14 by an aerosol propellant 16 from an aerosol container 20B. The locking aerosol dispenser 10B is shown with an overcap 30B being rotated into a first or open rotational position relative to the aerosol container 20B.

The overcap 30B is rotationally secured to the aerosol container 20B by the mounting 40B. The overcap 30B includes an actuator 50B pivotably connected to the overcap 30B by a hinge 60B.

The actuator 50B is shown in an unattended condition.

An aerosol valve 80B is mounted to the aerosol container 20B by an aerosol mounting cup 90B. Preferably, the aerosol valve 80B is a tilt valve but it should be understood that the invention may be modified to function with a vertical action valve.

FIGS. 34-36 illustrate the overcap 30B in a first or open rotational position relative to the aerosol container 20B. When the overcap 30B is located in the first or open rotational position, the actuator 50B is positioned for actuating the aerosol valve 80B to dispense the aerosol product 14 under the pressure of the aerosol propellant 16 from the aerosol container 20B and to be discharged from a terminal orifice 78B.

FIGS. 49-52 illustrate the overcap 30B in a second or locked rotational position relative to the aerosol container 20B. When the overcap 30B is located in the second or locked rotational position, the actuator 50B is inhibited from actuating the aerosol valve 80B to prevent the aerosol product 14 from being dispensed from the aerosol container 20B.

The container 20B is shown as a cylindrical container extending between a top portion 21B and a bottom portion 22B. The bottom portion 21B of the aerosol container 20B is closed by an endwall. The aerosol container 20B defines a cylindrical sidewall 23B defining a container rim 24A extending about an outer diameter of the aerosol container 20B.

FIGS. 38-41 are enlarged views of portions of FIGS. 35 and 37 respectively. The top portion 21B of the aerosol container 20B tapers radially inwardly into a neck 25B terminating in a bead 26B. A flange 27B extends radially outward about the neck 25B of the aerosol container 20B. A key aperture 28B is defined in the flange 27B. In this example, the key aperture 28B is shown as a slot. The aerosol container 20B defines an axis of symmetry 29B. The aerosol container 20B may be made of a metallic material or a non-metallic material. In this example, the aerosol

container 20B is shown as a plastic bottle.

The aerosol valve 80B is secured to the aerosol mounting cup 90B in a conventional fashion. A peripheral rim 92A of the aerosol mounting cup 90B is sealed to the bead 26B of the aerosol container 20B. A valve stem 82B extends from the aerosol valve 80B in alignment with an axis of symmetry 29B of the aerosol container 20B. The valve stem 82B is adapted to be received by a socket 73B defined in the overcap 30B.

The overcap 30B has a top portion 31B and a bottom portion 32B with a sidewall 33B extending therebetween. The bottom portion 32B of the overcap 30B has a generally circular cross-section for mating with the top portion 21B of the aerosol container 20B. The overcap 30B is aligned with the axis of symmetry 29B of the aerosol container 20B. The overcap 30B defines an overcap orifice 39B provided for accommodating the actuator 50B. The overcap 30B comprises a plastic shell formed from a unitary and resilient polymeric material such as polypropylene, polyethylene, polyolyfin or any other suitable polymeric material.

The rotational mounting 40B comprises a plurality of ribs 41B extending inwardly from the sidewall 33B of the overcap 30B. Each of the plurality of ribs 41B terminates in a tapered end 43B adjacent to the bottom portion 32B of the overcap 30B. Each of the plurality of ribs 41B has an inwardly extending tab 46B. Preferably, the overcap 30B and the plurality of tabs 46B are integrally formed from a deformable and resilient polymeric material. The deformable and resilient material enables the overcap 30B to be resiliently mounted to the aerosol container 20B.

The plurality of tabs 45B engage with the peripheral rim 92B of the aerosol mounting cup 90B. Simultaneously therewith, the bottom portion 32B of the overcap 30B engages with the aerosol container 20B. The simultaneous engagement of the plurality of tabs 45B and the bottom portion 32B of the overcap 30B with the aerosol container 20B forms the rotational mounting 40B

to secure the overcap 30B to the aerosol container 20B. Preferably, the overcap 30B is snapped over the peripheral rim 92B of the aerosol mounting cup 90B to form a rotational snap locking engagement.

The actuator 50B is movably mounted relative to the overcap 30B within the overcap orifice 39B. In this example of the invention, the actuator 50B is pivotably mounted relative to overcap 30B for moving the valve stem 82B upon pivoting of the actuator 50B. The actuator 50B is shown integrally connected to the overcap 30B through the hinge 60B integrally molded as a one-piece plastic unit with the overcap 30B. In this example, the hinge 60B pivots the actuator 50B about a hinge pivot axis generally perpendicular to the axis of symmetry 29B of the aerosol container 20B. However, it should be understood that the hinge 60B may pivot the actuator 50B about a hinge pivot axis having various angular or parallel relationships with the axis of symmetry 29B of the aerosol container 20B.

The actuator 50B includes an actuator surface 52B extending from the overcap orifice 39B defined in the overcap 30B. The actuator surface 52B enables an operator to pivot the actuator 50B for moving the valve stem 82B to displace the aerosol valve 80B into the open position to dispense the aerosol product 14 under the pressure of the aerosol propellant 16.

The actuator 50B defines a socket 53B for frictionally receiving the valve stem 82B of the aerosol valve 80B. A channel 56B extends through the actuator 50B to provide fluid communication between the valve stem 82B of the aerosol valve 80B and a terminal orifice 78B. A key 58B extends from the actuator 50B for cooperating with the key aperture 28B defined in the flange 27B.

FIGS. 42-44 are various views similar to FIGS. 15-17 illustrating a locator 100B of the locking aerosol dispenser 10B. The locator 100B operates in a similar fashion to the locator

100B referred to in FIGS. 1-33 with similar parts referred to with similar reference characters. The locator 100B locates the overcap 30B in the first and second first rotational positions relative to the aerosol container 20B. The locator 100B comprises a container locator 110B defined by the aerosol container 20B. The locator 100B comprises an overcap locator 120B defined by the overcap 30B. The container locator 110B cooperates with the overcap locator 120B for locating the overcap 30B in the first rotational position relative to the aerosol container 20B.

The container locator 110B comprises an open container locator 111B and a locked container locator 112B. The overcap locator 120B extends radially inwardly from the overcap. The overcap locator 120B provides an interference cooperation between each of the open and locked container locators 111B and 112B and the overcap locator 120B.

The locking aerosol dispenser 10B may optionally include an indicator 130B for indicating the position of the overcap 30B relative to the aerosol container 20B. The indicator 130B comprises container indicators 131B and 132B cooperating with an overcap indicator 133B for indicating the first and second first rotational positions of the overcap 30B relative to the aerosol container 20B.

FIGS. 45 and 46 illustrate the locking aerosol dispenser 10B with the overcap 30B disposed in the first rotational position and with the actuator 50B being located in an unattended condition. In the first rotational position, the container indicator 131B is aligned with the overcap indicator 133B. When the overcap 30B is disposed in the first rotational position, the key 58B extending from the actuator 50B is aligned with the key aperture 28B defined in the flange 27B.

FIGS. 47 and 48 are views similar to FIGS. 45 and 46 illustrating the actuator 50B in a depressed condition. When the actuator 50B is in the depressed condition, the key 58B extending from the actuator 50B moves within the key aperture 28B defined in the flange 27B. The

movement of the actuator 50B moves the valve stem 82B to open the aerosol valve 80B to dispense the aerosol product 14.

FIGS. 49-52 are views similar to FIGS. 34-37 illustrating the locking aerosol dispenser 10B with the overcap 30B disposed in the second rotational position and with the actuator 50B being located in an unattended condition. In the second rotational position, the container indicator 132B is aligned with the overcap indicator 133B.

FIGS. 53 and 54 illustrate the locking aerosol dispenser 10B with the overcap 30B disposed in the second rotational position. When the overcap 30B is disposed in the second rotational position, the key 58B extending from the actuator 50B is misaligned with the key aperture 28B defined in the flange 27B. The key 58B extending from the actuator 50B engages with the flange 27B to prevent depression of the actuator 50B and the opening of the aerosol valve 80B.

FIGS. 55-68 are various views of a third embodiment of the locking aerosol dispenser 10C of the present invention. The locking aerosol dispenser 10C is shown with an actuator 50C being rotated into a first or open rotational position relative to the aerosol container 20C. The actuator 50C is rotationally secured to the aerosol container 20C by the mounting 40C. The actuator 50C is shown in an unattended condition.

An aerosol valve 80C is mounted to the aerosol container 20C by an aerosol mounting cup 90C. Preferably, the aerosol valve 80C is a tilt valve but it should be understood that the invention may be modified to function with a vertical action valve.

FIGS. 55-58 illustrate the actuator 50C in a first or open rotational position relative to the aerosol container 20C. When the actuator 50C is located in the first or open rotational position, the actuator 50C is positioned for actuating the aerosol valve 80C to dispense the aerosol product 14

under the pressure of the aerosol propellant 16 from the aerosol container 20C and to be discharged from a terminal orifice 78C.

FIGS. 63-66 illustrate the actuator 50C in a second or locked rotational position relative to the aerosol container 20C. When the actuator 50C is located in the second or locked rotational position, the actuator 50C is inhibited from actuating the aerosol valve 80C to prevent the aerosol product 14 from being dispensed from the aerosol container 20C.

The container 20C is shown as a cylindrical container extending between a top portion 21C and a bottom portion 22C. The bottom portion 22C of the aerosol container 20C is closed by an endwall. The aerosol container 20C defines a cylindrical sidewall 23C defining a container rim 24A extending about an outer diameter of the aerosol container 20B.

FIGS. 59 and 60 are enlarged views of portions of FIGS. 55-57. The top portion 21C of the aerosol container 20C tapers radially inwardly into a neck 25C terminating in a bead 26C. A flange 27C extends radially outward about the neck 25C of the aerosol container 20C. A key aperture 28 is defined in the flange 27C. In this example, the key aperture 28C is shown as a slot. The aerosol container 20C defines an axis of symmetry 29C. The aerosol container 20C may be made of a metallic material or a non-metallic material. In this example, the aerosol container 20C is shown as a plastic bottle.

The aerosol valve 80C is secured to the aerosol mounting cup 90C in a conventional fashion. A peripheral rim 92C of the aerosol mounting cup 90C is sealed to the bead 26C of the aerosol container 20C. A valve stem 82C extends from the aerosol valve 80C in alignment with an axis of symmetry 29C of the aerosol container 20C. A valve stem 82C is adapted to be received by a socket 53C defined in the actuator 50C.

The actuator 50C is rotationally secured to the aerosol container 20C by the mounting 40C.

The actuator 50C is mounted on the valve stem 82C by the valve stem 82C being received within the socket 53C defined in the actuator 50C. The rotational mounting 40C comprises the rotation of the actuator 50C relative to the valve stem 82C and/or the rotation of the valve stem 82C within the aerosol valve 80C.

The socket 53C frictionally receives the valve stem 82C of the aerosol valve 80C. A channel 56C extends through the actuator 50C to provide fluid communication between the valve stem 82C of the aerosol valve 80C and a terminal orifice 78C. A key 58C extends from the actuator 50C for cooperating with the key aperture 28 defined in the flange 27B.

The actuator 50C is mounted relative to aerosol mounting cup 90C for moving the valve stem 82C upon pivoting of the actuator 50C. The actuator 50C includes an actuator surface 52C for enabling an operator to pivot the actuator 50C for moving the valve stem 82C to displace the aerosol valve 80C into the open position to dispense the aerosol product 14 under the pressure of the aerosol propellant 16.

A locator 100C locates the actuator 50C in the first and second first rotational positions relative to the aerosol container 20C. The locator 100C comprises a container locator 110C defined by the aerosol container 20C. The locator 100C comprises an actuator locator 120C defined by the actuator 50C. The container locator 110C cooperates with the actuator locator 120C for locating the actuator 50C in the first rotational position relative to the aerosol container 20C.

The container locator 110C comprises the flange 27C having a first and a second flange 111C and 112C. The first flange portion 111C is greater than the second flange portion 112C of the flange 27C. In this example, the first flange portion 111C is elevated relative to the second flange portion 112C of the flange 27C. The elevated first flange portion 111C creates stops 114C

and 116C.

The locking aerosol dispenser 10C may optionally include an indicator 130C for indicating the position of the actuator 50C relative to the aerosol container 20C. The indicator 130C comprises container indicators 131C and 132C cooperating with the actuator for indicating the first and second first rotational positions of the actuator 50C relative to the aerosol container 20C.

FIGS. 59 and 60 illustrate the locking aerosol dispenser 10C with the actuator 50C disposed in the first rotational position and with the actuator 50C being located in an unattended condition. In the first rotational position, the container indicator 131C is aligned with the actuator 50C. When the actuator 50C is disposed in the first rotational position, the key 58C extending from the actuator 50C is aligned with the key aperture 28C defined in the flange 27C.

FIGS. 61 and 62 are views similar to FIGS. 59 and 60 illustrating the actuator 50C in a depressed condition. When the actuator 50C is in the depressed condition, the key 58C extending from the actuator 50C moves within the key aperture 28C defined in the flange 27C. The movement of the actuator 50C moves the valve stem 82C to open the aerosol valve 80C to dispense the aerosol product 14.

FIGS. 63-66 are views similar to FIGS. 49-52 illustrating the locking aerosol dispenser 10C with the actuator 50C disposed in the second rotational position and with the actuator 50C being located in an unattended condition. In the second rotational position, the container indicator 132C is aligned with the actuator 50C.

FIGS. 67 and 68 illustrate the locking aerosol dispenser 10C with the actuator 50C disposed in the second rotational position and with the actuator 50C. When the actuator 50C is disposed in the second rotational position, the key 58C extending from the actuator 50C is misaligned with the key aperture 28C defined in the flange 27C. The key 58C extending from the actuator 50C engages

with the flange 27C to prevent depression of the actuator 50C and the opening of the aerosol valve 80C.

Although the invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention.